

BERKELEY UNIFIED SCHOOL DISTRICT

REPORT OF GROUP TEST RESULTS
OF
INTELLIGENCE AND ACADEMIC ACHIEVEMENT
FOR THE
SCHOOL YEAR — FALL, 1967 SPRING, 1968

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INTRODUCTION

This report includes group test results of the school year 1967-68. The results are presented in chronological order, the Fall testing first, followed by the Spring testing. The state-mandated schedule at grades 1, 2, 3, 6, and 10 was supplemented by District testing at grades 4, 5, and 8. In addition, state normative data has been secured and is used to draw comparisons between Berkeley and California scores.

The results contained here are reported in a variety of statistical concepts, depending upon the tests administered. The following brief definitions are presented as an aid to understanding the results.

IQ -- A measure of brightness that takes into account both the score on an intelligence test and age. It is based on the difference between a person's obtained score and the score that is normal for the person's age.

Percentile (%ile) -- A point in a distribution of scores below which the per cent of cases indicated by the given percentile falls. Thus, the 43%ile indicates the score below which 43 per cent of the scores fall. (Percentile has nothing to do with per cent of correct answers achieved on a test.)

Grade Equivalent -- The grade level for which a given score is the real or estimated average, expressed as a decimal fraction and read, for example, (6.2) as sixth grade, second month.

• 1925 100

Mean — The result of dividing the sum of a set of scores by the number of scores; sometimes written as $\bar{X}$. (Commonly known as the average.)

Median — The middle point in a distribution; the point that divides the group into two equal parts; the 50%ile; the second quartile (Q2).

Quartile — One of three points that divide a distribution of scores into four equal groups. Q3 = 75%ile; Q2 = Median or 50%ile; Q1 = 25%ile.

Standard Deviation (SD) — A measure of the variability or dispersion of a set of scores. The more the scores cluster around the mean, the smaller the standard deviation; the wider the dispersion, the larger the standard deviation.

The tests employed in securing the data presented in the report are for the most part dictated by the District's need to meet the requirements of the state-mandated testing program. This is true for grades 1, 2, 3, 6, and 10 where the Lorge-Thorndike Intelligence Test and/or the Stanford Achievement Test are used.

A general word of caution should be sounded against making a too literal interpretation of the grade placement scores made on the SAT by the District's low achievers. A significant number of the students falling into the lower quartile were found to be making raw scores which fell below the chance level. That is to say they could have been expected to make scores on the test as good as or better than their scores by merely marking answers at random. Consequently, the validity of their raw scores (and hence the derived grade placement scores) must be questioned.

One possible solution to this problem would be to administer

a lower level form of the test to the students, but we are precluded from doing this because the test level is stipulated by the state in this mandated test. This problem is dealt with in the evaluation report of the 1967-68 ESEA Title I project.

In the Fall and Spring sections of the report, grade level summary statistics are presented in table form and a brief explanation of the findings is made. Frequently this is followed by a graph which illustrates the frequency distribution of a selected set of test scores.

Because of the lack of the necessary data from the state, it has not been possible to graphically illustrate the third section of the report. The method employed is therefore restricted to the use of tables and interpretation of the comparative statistics contained therein.

GROUP TEST RESULTS

FALL 1967

THIRD GRADE RESULTS

Lorge-Thorndike Intelligence Test, Level A, Form 2

This is a test of abstract intelligence, the ability to work with ideas and the relationship among ideas. The test is based on the premise that most abstract ideas with which the student deals are expressed in verbal symbols, so much so that verbal symbols are the appropriate medium for the testing of abstract intelligence. The non-verbal set of the test parallels the verbal set; it is for poor readers or those for whom printed words might constitute an inadequate basis for appraising individual abilities.

TABLE 1. THIRD GRADE TEST RESULTS
 NATIONAL MEAN — 100.0
 BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
 LORGE-THORNDIKE INTELLIGENCE TEST, LEVEL A, FORM 2

(1,142 Students)

Range	Mean	Standard Deviation	Upper Quartile	Median	Lower Quartile
58-143	101.7	15.1	112	103	91

The statistics reported in Table 1 show that the mean Total IQ score for the third graders (101.7) is slightly above the national mean of 100.0. The median score of 103 indicates that slightly more scores fall above the mean than below. The standard deviation of 15.1 is about normal according to national norms, indicating a range of abilities similar to that found in the general population. The

upper and lower quartiles fall ten and eleven points away from the median, suggesting a fairly symmetrical distribution of scores.

Figure 1 illustrates the approximate normality of the distribution of scores, with a very high number of scores falling at or around the mean.

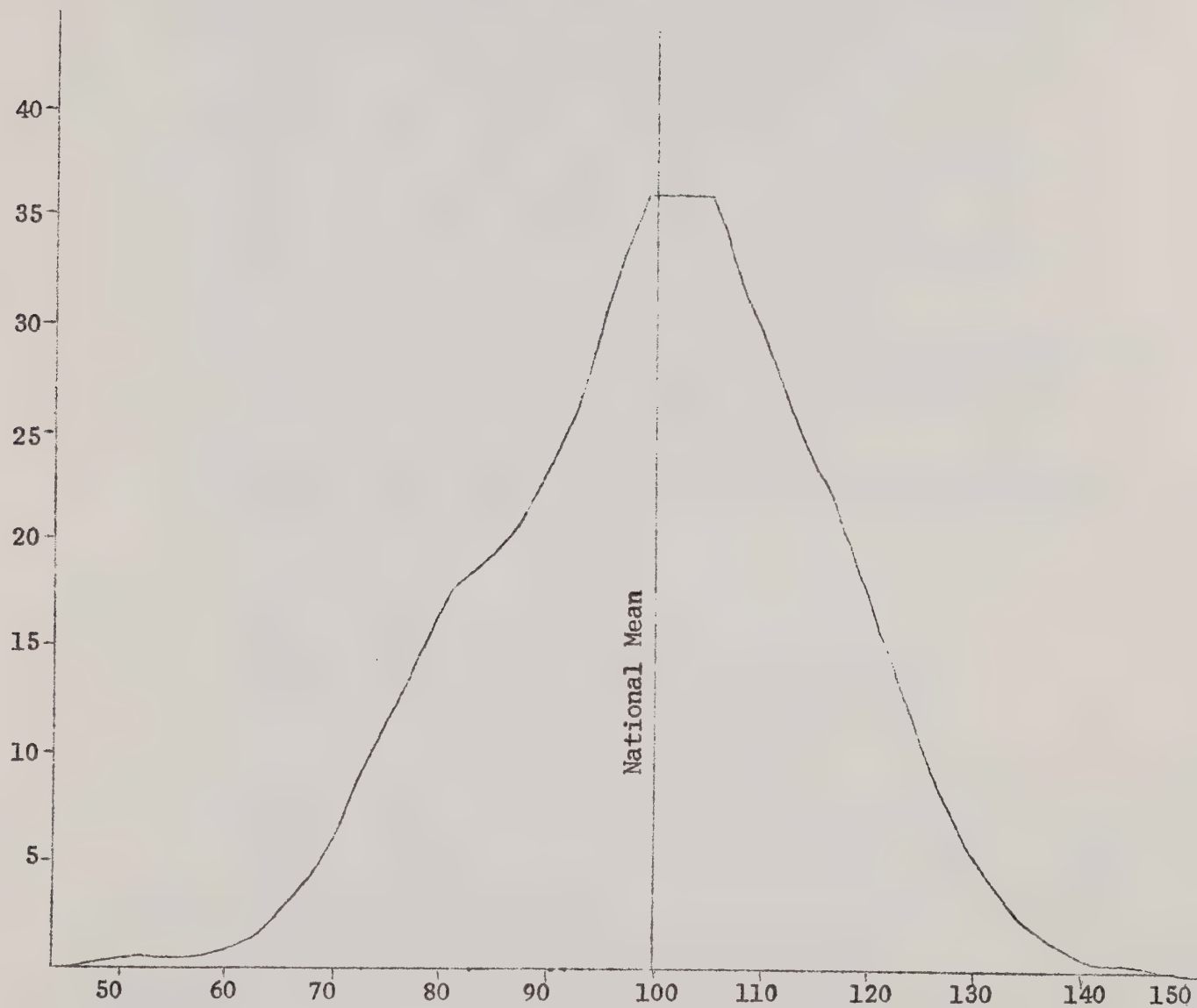


FIGURE 1. BERKELEY UNIFIED SCHOOL DISTRICT —FALL, 1967
 LORGE-THORNDIKE INTELLIGENCE TEST, LEVEL A, FORM 2
 THIRD GRADE — NATIONAL MEAN 100.0
 TOTAL IQ SCORES

Abscissa (X), IQ Scores; Ordinate (Y), Frequencies

FOURTH GRADE RESULTS

Stanford Achievement Test, Intermediate I, Form W -- Partial Battery

Word Meaning — Vocabulary items chosen from general reading, school subject matter areas, and everyday communication.

Paragraph Meaning — Longer paragraphs include some about which questions are asked, with an increased emphasis on inference.

Spelling — Multiple choice items in which the pupil chooses from four words the one which is spelled incorrectly.

Word Study Skills — Phonics and syllabication.

Language — Exercises in usage, punctuation, capitalization, dictionary skills, and sentence sense.

Arithmetic Computation — Fundamental operations in addition, subtraction, multiplication, and division.

Arithmetic Concepts — Understanding of place value, Roman numerals, operational terms and relationships, number series, number names, estimation, and directed numbers.

Arithmetic Applications — Key concepts applied to reasoning with problems taken from life experiences and to abstract reasoning in mathematical skills.

TABLE 2. FOURTH GRADE TEST RESULTS
 NATIONAL MEAN — 4.2
 BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE I, FORM W
 GRADE EQUIVALENT SCORES (1,075 Students)

	Word Mean.	Para. Mean.	Spell.	Word St. Sk.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.
Mean	4.5	4.4	4.2	4.3	3.9	3.5	4.1	4.3
Standard Deviation	1.7	1.8	1.6	1.9	1.8	0.8	1.7	1.5
Upper Quartile	5.6	5.5	4.8	6.0	5.0	4.0	5.52	5.2
Median	4.1	4.0	3.8	3.9	3.3	3.6	4.0	4.0
Lower Quartile	3.1	2.9	3.1	2.5	2.6	2.9	2.5	3.2

According to the mean figures in Table 2, Berkeley fourth graders are performing at about grade level in all areas except Arithmetic Computation. If we examine the Computation upper quartile score (4.0), we find that less than 25% of the fourth graders are working at grade level or above. This relatively poor showing is undoubtedly due, in part, to the use of the new math in the Berkeley schools, since other districts using new math have low Computation scores.* However, Berkeley's mean grade equivalent score of 3.5 falls at only the 22nd percentile nationally, and suggests a need for remediation in this area.

The median scores for all tests fall below the mean scores, thus indicating that there are some high scores which are not balanced by correspondingly low scores.

Figure 2 illustrates the distribution of scores for two of the arithmetic subtests. The curve for Arithmetic Computation shows a somewhat normal distribution, in contrast to the curve for Arithmetic Concepts, which is positively skewed and exhibits the bimodality more usually found in frequency distributions for Berkeley.

* See Appendix for copy of memo to SAC regarding the research on the effect of new math scores on the Arithmetic Computation subtest of the SAT.

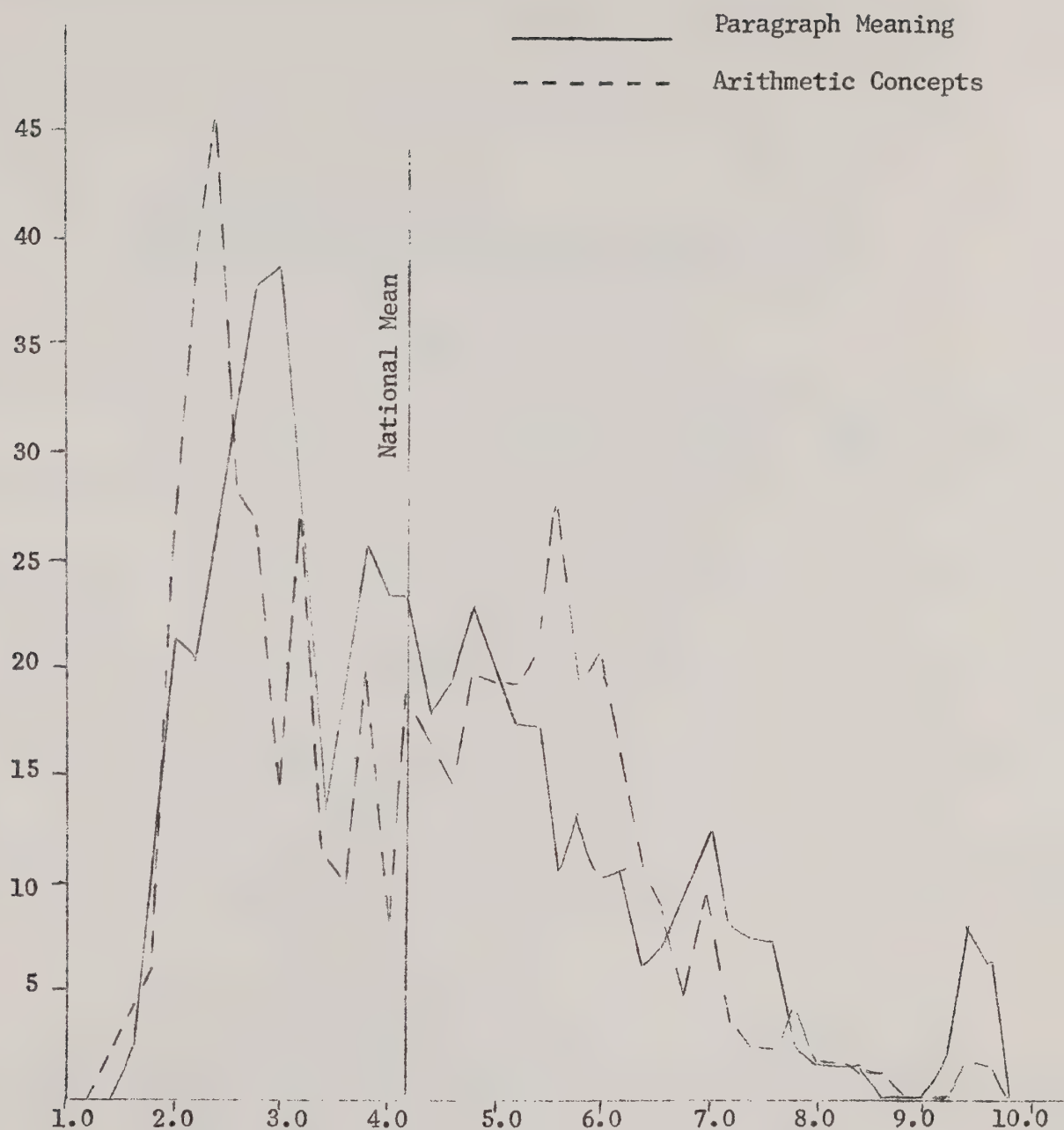


FIGURE 2. BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE I, FORM W
 FOURTH GRADE -- NATIONAL MEAN 4.2
 PARAGRAPH MEANING AND ARITHMETIC CONCEPTS

Abscissa (X) Grade Equivalents; Ordinate (Y), Frequencies

FIFTH GRADE RESULTS

Stanford Achievement Test, Intermediate I, Form Y — Partial Battery

This test is an alternate form of the test given to the fourth grade. Scores were derived from fifth grade norms.

TABLE 3. FIFTH GRADE TEST RESULTS
 NATIONAL MEAN — 5.2
 BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE I, FORM Y
 GRADE EQUIVALENT SCORES (1,112 Students)

	Word Mean.	Para. Mean.	Spell.	Word St. Sk.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.
Mean	5.4	5.2	5.0	5.1	5.1	4.5	5.3	5.1
Standard Deviation	2.2	2.3	1.8	2.1	2.4	1.3	1.9	1.9
Upper Quartile	7.5	6.9	6.0	6.8	7.1	5.4	6.8	6.5
Median	5.2	4.8	4.7	5.3	4.8	4.4	5.4	4.7
Lower Quartile	3.5	3.1	3.6	2.9	2.9	3.5	3.6	3.4

The mean scores for fifth graders on the Stanford Achievement Test subtests show that they are performing at or near their grade level according to national norms, with the exception of the Arithmetic Computation. As with the fourth grade, this low math score may be attributed at least in part to the use of the new math in the Berkeley schools. However, the mean score for Arithmetic Computation falls at the 30th

percentile, which is lower than should be expected, even considering the lag usually encountered where new math is being taught.

Note that in the Word Study Skills and Language subtests, 25% of the fifth graders appear to be performing below the third grade level. There is a consistent pattern among the low achievers across all grades tested in which the lowest scores reported are in the Word Study Skills and Language areas.

SIXTH GRADE RESULTS

Stanford Achievement Test, Intermediate II, Form W -- Partial Battery

Word Meaning -- Testing in sentence context enables measurement of comprehension of the concepts represented by words, rather than mere synonyms.

Paragraph Meaning -- Balanced reading content represents the science, social studies, and humanities areas and calls for interpretation and logical thinking.

Spelling -- The pupil must identify a misspelled word in 56 groups with four words in each group.

Language -- More complex problems of usage and punctuation are used; dictionary skills and sentence structure become more sophisticated.

Arithmetic Computation -- Balanced coverage is given to the skills of computation with whole numbers, common and decimal fractions, and denominate numbers.

Arithmetic Concepts -- Concepts tested are extended to include place value in decimal fractions, common denominators, averages, number sentences, meaning of per cent, decimal-fraction equivalents, reduction of fractions, geometric terms and estimation.

Arithmetic Applications -- Realistic problems involve inter-relationships of computation, measurement, and logical thinking.

TABLE 4. SIXTH GRADE TEST RESULTS
 NATIONAL MEAN -- 6.2
 BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE II, FORM W

 GRADE EQUIVALENT SCORES (1,138 Students)

	Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.
Mean	6.1	6.3	6.1	6.0	5.2	6.4	6.4
Standard Deviation	2.0	2.5	2.3	2.6	1.7	2.8	2.6
Upper Quartile	7.6	7.8	7.6	7.7	6.0	7.8	8.3
Median	5.9	6.1	5.9	5.9	5.0	6.1	6.1
Lower Quartile	4.4	4.3	4.4	3.7	4.1	4.9	4.2

The mean scores presented in Table 4 show that, according to the norms of the Stanford Achievement Test, Berkeley's sixth graders are performing at or near grade level in all tests, with the exception of Arithmetic Computation. The medians present a similar pattern, though they are slightly lower. In Arithmetic Computation, the sixth graders are working a year below grade level. The mean score of 5.2 falls at the twenty-third percentile nationally. As with the fourth and fifth grades, this is probably partially a result of the use of the new math; but also indicates a need for remediation.

We continue to see 25% of the students performing over two years below grade level in language skills.

Figure 3 illustrates the frequency distribution for Arithmetic Computation. As was suggested by the statistics on Table 4, we see that a large number of students were unable to perform at a satisfactory level on the Arithmetic Computation subtest. Note that the curve is generally bi-modal, but that both modes fall below grade level.

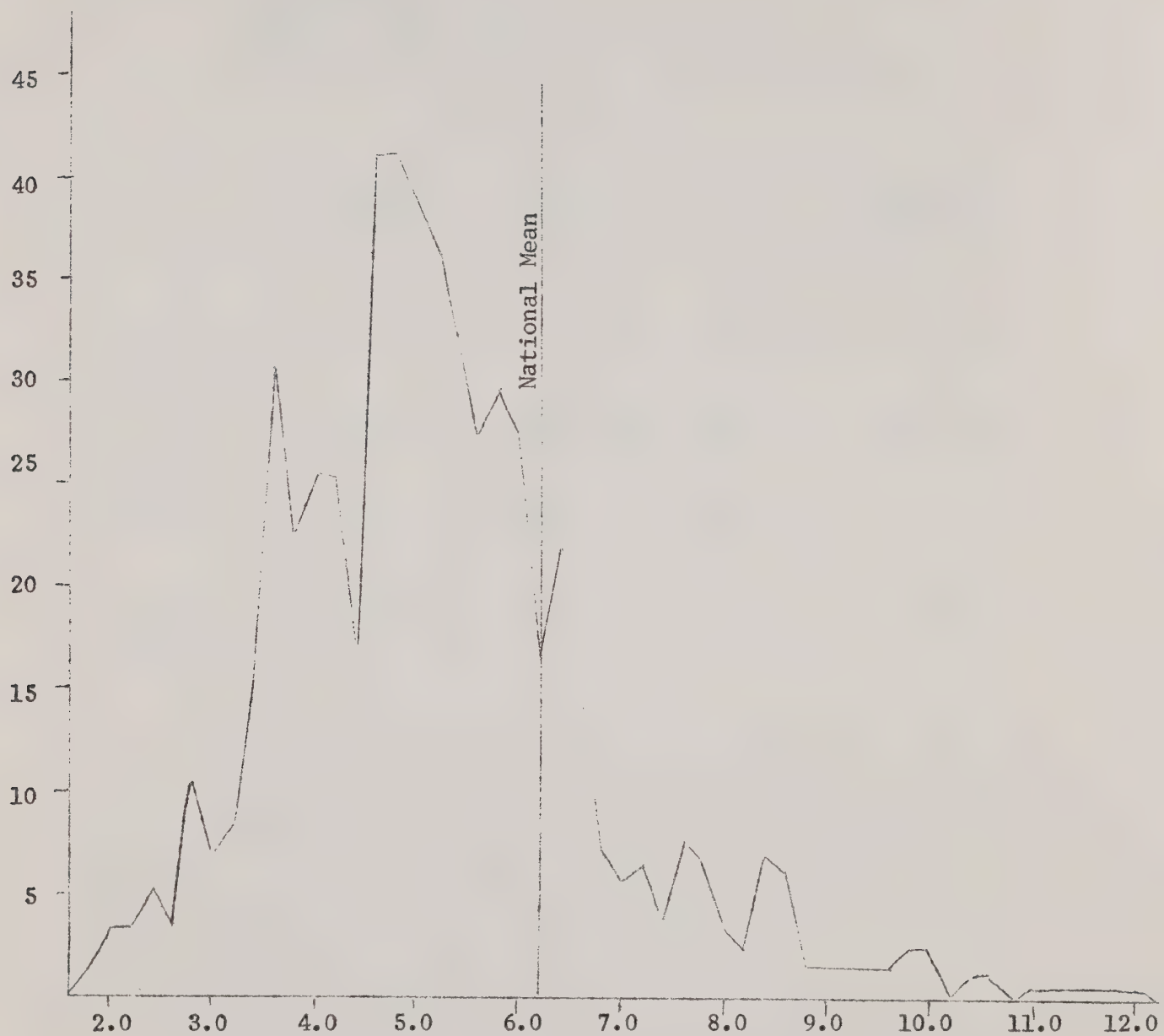


FIGURE 3. BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE II, FORM W
 SIXTH GRADE -- NATIONAL MEAN 6.2
 ARITHMETIC COMPUTATION

Abscissa (X), Grade Equivalents; Ordinate (Y), Frequencies

Lorge-Thorndike Intelligence Test, Level D, Form 1

This intelligence test is similar in purpose to the third grade test, but at a higher level.

TABLE 5. SIXTH GRADE TEST RESULTS
 NATIONAL MEAN -- 100.0
 BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
 LORGE-THORNDIKE INTELLIGENCE TEST, LEVEL D, FORM 1

(1,143 Students)

	Verbal IQ	Non-Verbal IQ	Total IQ	State Norms Verbal IQ
Mean	103.9	106.9	105.6	99.5
Standard Deviation	20.3	20.0	19.3	15.3
Upper Quartile	119	122	120	109.8
Median	104	108	107	99
Lower Quartile	88	91	89	88.7

Table 5 indicates that sixth graders rank above the national and state averages in both verbal and non-verbal areas of this intelligence test. Berkeley's standard deviation is greater than the national or state norms for the standard deviation, reflecting a wider than average spread of scores.

There is practically no difference between local and state Verbal IQ scores at the lower quartile level, but Berkeley exceeds California by five points at the median and by nearly ten points at

the upper quartile level. This leads to the conclusion that Berkeley's greatest deviation from the norm comes at the upper end of the ability scale. This parallels the findings of the differences found between state and local achievement scores which are presented elsewhere in this report.

Figure 4 shows the wide range of scores reported on above. It illustrates a bi-modal distribution of ability scores which tends to be characteristic of Berkeley students.



FIGURE 4. BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
 LORGE-THORNDIKE INTELLIGENCE TEST, LEVEL D, FORM 1
 SIXTH GRADE — NATIONAL MEAN 100.0
 TOTAL IQ SCORES

Abscissa (X), IQ Scores; Ordinate (Y), Frequencies

EIGHTH GRADE RESULTS

School and College Ability Test, Level 4A

School and College Ability Tests (SCAT) aid in estimating the capacity of a student to undertake the academic work of the next higher level of schooling. They measure the two kinds of school-related abilities which are considered most important in the greatest number of school and college endeavors: verbal and quantitative. The test consists of sentence understanding, numerical computation, word meaning, and numerical problem solving. It yields three scores: Verbal, Quantitative, and Total. Raw scores are changed to converted scores which, in turn, are translated to percentile bands for individual student scores, and to mean norms and mid-percentile ranks for group evaluation.

TABLE 6. EIGHTH GRADE TEST RESULTS
NATIONAL MEAN -- 50.0
BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
SCHOOL AND COLLEGE ABILITY TEST, LEVEL 4A

(1,034 Students)

	Verbal Mid-%ile Rank	Quantitative Mid-%ile Rank	Total Mid-%ile Rank
Mean	55	36	45
Upper Quartile	90	75	86
Median	65	41	52
Lower Quartile	29	12	17

The mean mid-percentile scores presented in Table 6 show that Berkeley's scores are slightly above that national norm in verbal skills as measured by the School and College Ability Test, but are fourteen percentage points below the norm in quantitative skills. Note that the median ranks are consistently above the ranks for the mean scores, suggesting a relatively high frequency of low scores on both verbal and quantitative tests. Comparatively low scores on quantitative tests have been noted in the results of other tests already reported on earlier.

The ranking of the upper quartile scores shows that the top 25% of the eighth grade falls at the national norm (75th percentile) on the quantitative test and considerably above the national norm on the verbal test. At the same time, the lower quartile rank falls thirteen percentage points below the national norm (25th percentile) on the quantitative portion and four points above on the verbal test. The scores for the quantitative portion of the test are nearly the same as those reported last year.

Figure 5 illustrates the frequency distribution of raw scores from the verbal portion of the SCAT, with the lower and upper quartiles and the mean and median shown. Note that the figure is skewed to the left, which illustrates the large number of students obtaining relatively low scores, and at the same time the small range of scores above the median.

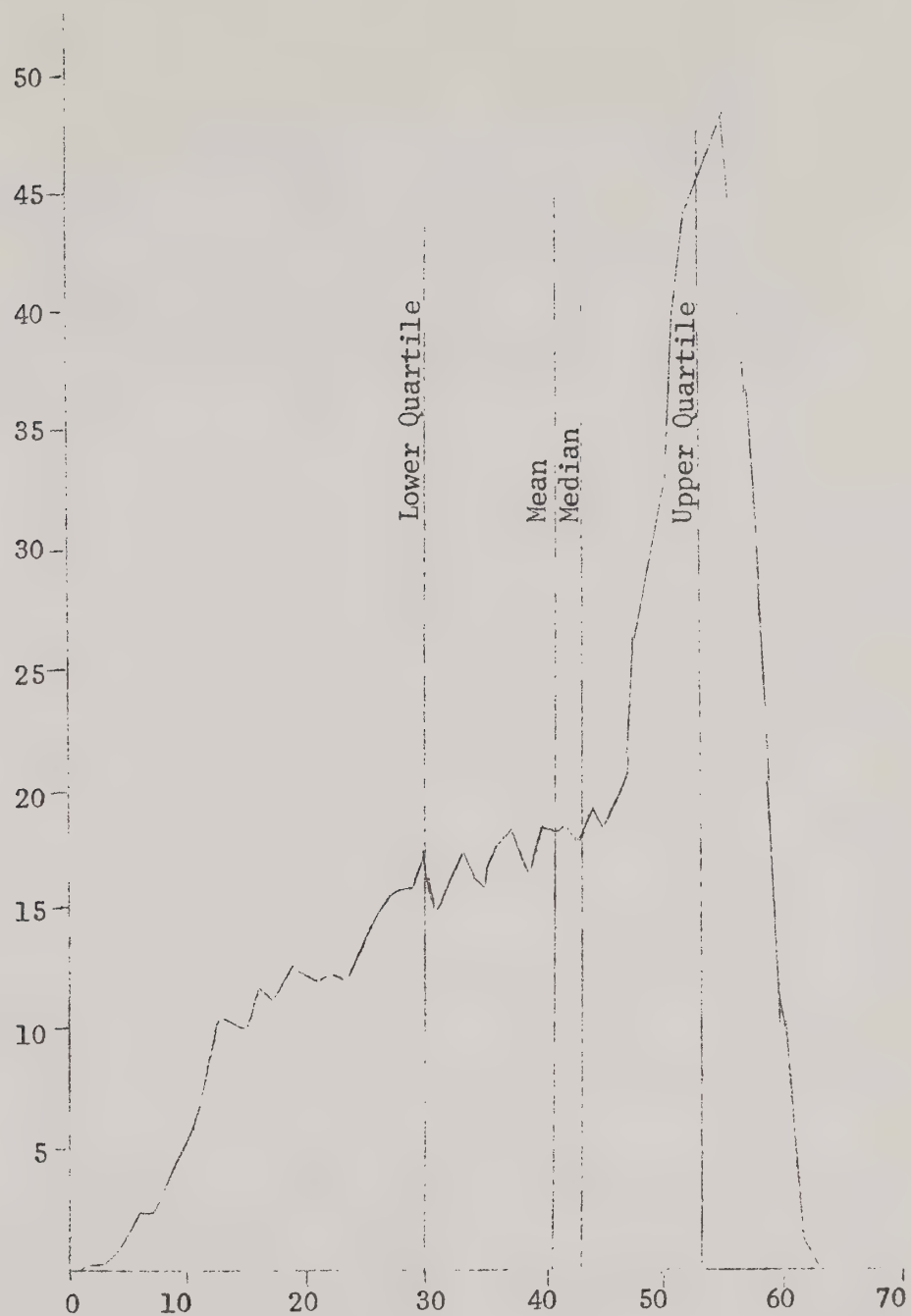


FIGURE 5. BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
SCHOOL AND COLLEGE ABILITY TEST, LEVEL 4A
EIGHTH GRADE — NATIONAL MEAN 50.0
VERBAL

Abscissa (X), Raw Scores; Ordinate (Y), Frequencies

TENTH GRADE RESULTS

Lorge-Thorndike Intelligence Test, Multi-Level

This intelligence test is similar in purpose to the third and sixth grade tests, but at a higher level.

TABLE 7. TENTH GRADE TEST RESULTS
NATIONAL MEAN — 100.0
BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
LORGE-THORNDIKE INTELLIGENCE TEST, MULTI-LEVEL

(1,040 Students)

	Verbal IQ	Non-Verbal IQ	Total IQ	State Norms Verbal IQ
Mean	102.7	104.5	103.7	100.8
Standard Deviation	19.2	17.7	17.5	15.1
Upper Quartile	117	117	117	111.3
Median	102	104	104	100.5
Lower Quartile	87	91	90	89.8

The mean IQ score for Berkeley tenth graders is slightly above the national and state means on both the verbal and the non-verbal portions of the Lorge-Thorndike Intelligence test, as shown in Table 7. Both the mean and median scores for the non-verbal portion of the test are higher than the mean and median scores for the verbal portion of the test. The standard deviations for Berkeley scores shown are higher than either the national or state

average, indicating a wider spread of scores than is usually found. Note that the standard deviation for the verbal IQ scores is the highest, indicating a wider spread of verbal scores than non-verbal scores. It is interesting to note that the upper quartile scores for all three sets of IQ scores fall at 117. At the same time the median score for the verbal IQ is two points below that for non-verbal. These differences suggest that students in the upper quartile tend to perform equally well on the verbal and non-verbal portions of the Lorge-Thorndike Intelligence test, and that children with lower IQ scores tend to do better on the non-verbal portion of the test. The indication is that this discrepancy gets larger as IQ scores get lower.

The same relationship between state and local IQ scores that was observed at the sixth grade level is seen again at the tenth grade, although it is less pronounced in the latter case.

Figure 6 illustrates the relatively even distribution of test scores for both measures, as well as the large spread of scores obtained. Note that the most irregular curve is that for the verbal scores. It tends more toward the bi-modal distribution characteristic of Berkeley test scores that was earlier observed in the sixth grade distribution.

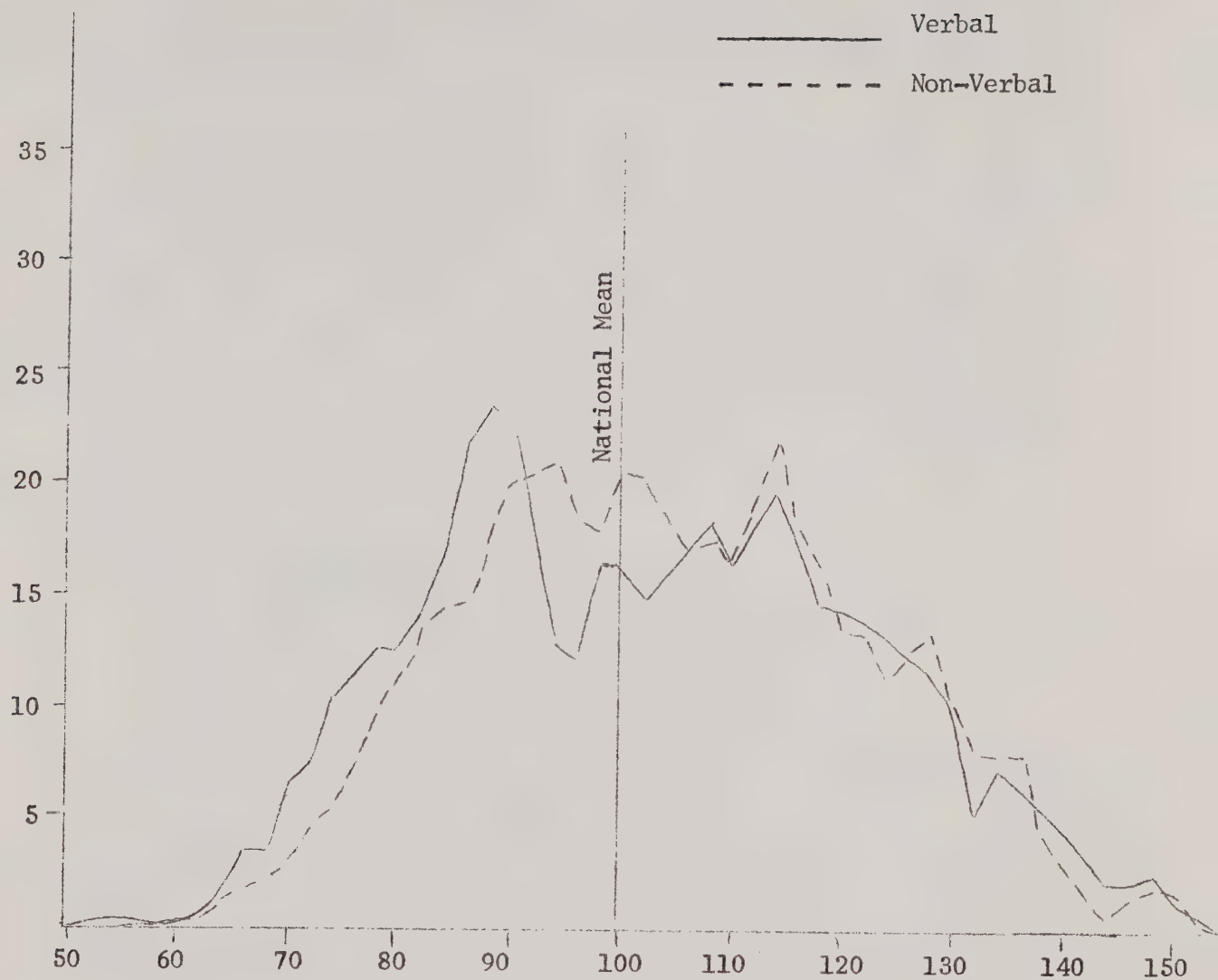


FIGURE 6. BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
 LORGE-THORNDIKE INTELLIGENCE TEST, MULTI-LEVEL
 TENTH GRADE — NATIONAL MEAN 100.0
 VERBAL AND NON-VERBAL IQ SCORES

Abscissa (X), IQ Scores; Ordinate (Y) Frequencies

Test of Academic Progress -- Reading Test

This test consists of passages dealing with many different types of material, e.g., biography, nature, logical reasoning, personal hygiene, cultural history, description, human relationships, general science, etc.

Most of the items require the student to discover meanings rather than simply locate information. Many questions require the student to coordinate information in order to see relationships among facts and arrive at valid conclusions. The test consists of 66 items, and the raw scores are converted into standard scores which then determine the percentile rank.

TABLE 8. TENTH GRADE TEST RESULTS
NATIONAL MEAN - 50TH PERCENTILE
BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
TEST OF ACADEMIC PROGRESS -- READING

STANDARD SCORES AND PERCENTILE RANKS

	Mean	Standard Deviation	Upper Quartile	Median	Lower Quartile
Standard Score	47.1	10.9	55	48	39
Percentile Rank	48	—	96	59	6

Table 8 reports the standard scores and publisher's national percentiles for the reading portion of the Test of Academic Progress. It is interesting to note that Berkeley's mean standard score of 47.1 has a national percentile rank of 48, while the median standard score of 48 falls at the 59th percentile nationally. Since the mean and

median scores are normally very closely related as standard scores, the discrepancy in the percentile ranks is probably an indication of a large number of people obtaining standard scores of 47 or 48 nationwide. The mean score for Berkeley students falls close to the fiftieth percentile nationally. But the national percentile ranks of Berkeley's upper and lower quartile scores indicate that Berkeley's score distribution is rather atypical. Note that the upper 25% of Berkeley's scores fall on or above the 96th percentile nationally, while the lower 25% of Berkeley's scores fall on or below the sixth percentile nationally. One assumption to be made from this is that the norming group was insufficient in size and/or lacked the diversity necessary to be truly representative of tenth graders nationally.

Figure 7 is based on the frequency distribution of standard scores for Berkeley.

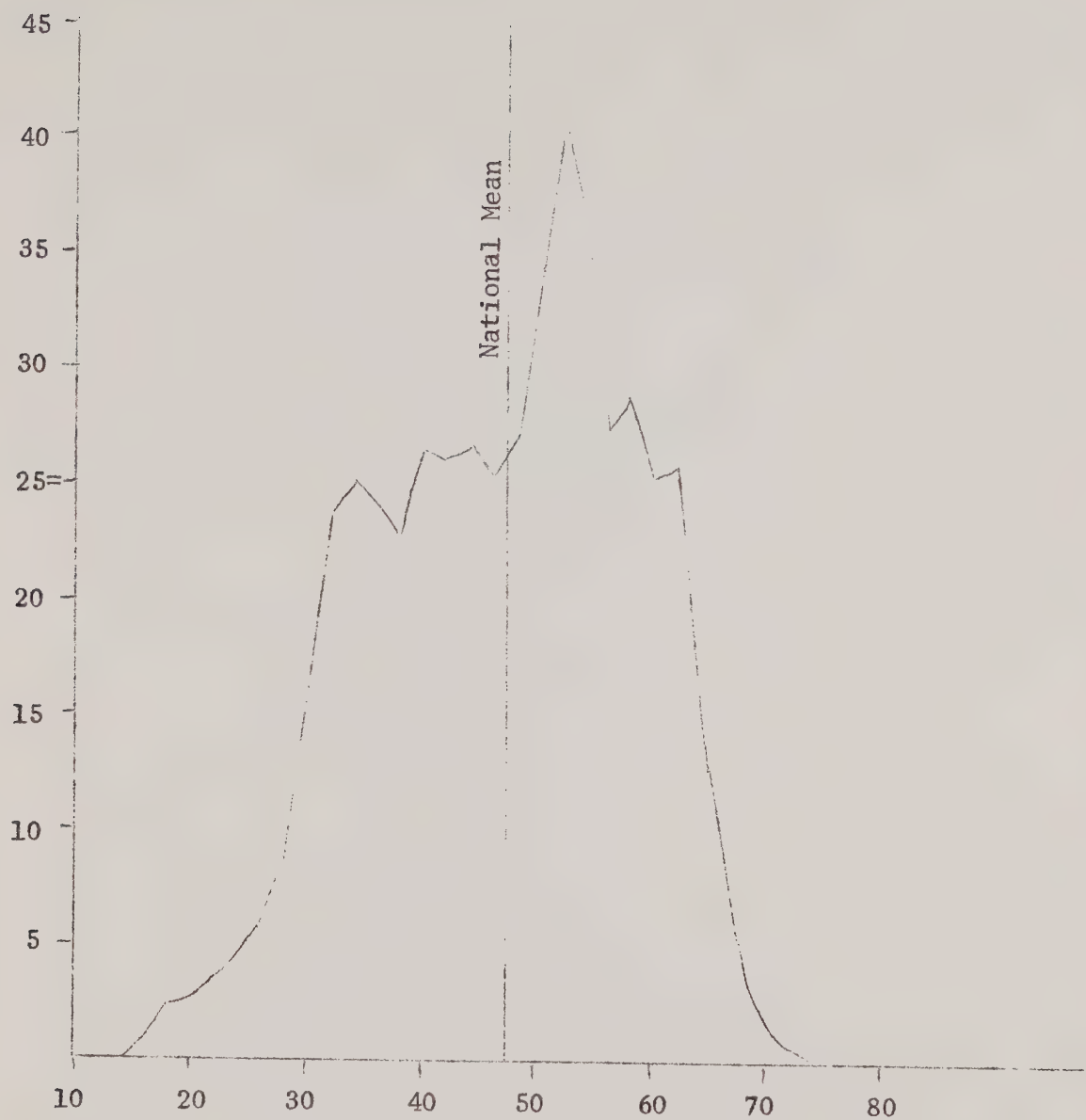


FIGURE 7. BERKELEY UNIFIED SCHOOL DISTRICT — FALL, 1967
TEST OF ACADEMIC PROGRESS
TENTH GRADE — NATIONAL MEAN 50TH PERCENTILE
READING TEST

Abcissa (X). Standard Scores; Ordinate (Y), Frequencies

GROUP TEST RESULTS

SPRING 1968

FIRST GRADE RESULTS

Stanford Achievement Test, Primary I, Form W

Word Meaning — Simple matching of word symbols with pictures.

Paragraph Meaning — Comprehension of passages requiring integration of meaning of from one to six sentences.

TABLE 9. FIRST GRADE TEST RESULTS
NATIONAL MEAN — 1.9
BERKELEY UNIFIED SCHOOL DISTRICT — SPRING, 1968
STANFORD ACHIEVEMENT TEST, PRIMARY I, FORM W

GRADE EQUIVALENT SCORES (1,245 Students)

	Word Meaning	Paragraph Meaning	Total Reading
Mean	2.0	1.9	1.9
Standard Deviation	0.7	0.7	0.7
Upper Quartile	2.5	2.4	2.5
Median	1.8	1.7	1.7
Lower Quartile	1.5	1.5	1.5

The mean test scores for the first grade reading test (Table 9) indicate that Berkeley's first graders are at grade level in reading ability according to the Reading portion of the Stanford Achievement Test. The slightly lower medians in each case would indicate some very high scores pulling up the mean scores. The lower quartiles for each measure shown are about 0.2 grade lower than the median, suggesting a

high frequency for a small range of scores just below the median. At the same time, the upper quartile falls 0.7 grade above the median, indicating a wider spread of scores for the top 50% of the first graders. The frequency distributions of these three measures, illustrated in Figure 8, demonstrate the conclusions suggested by these statistics. These test results are very similar to those reported for last year's first grade.

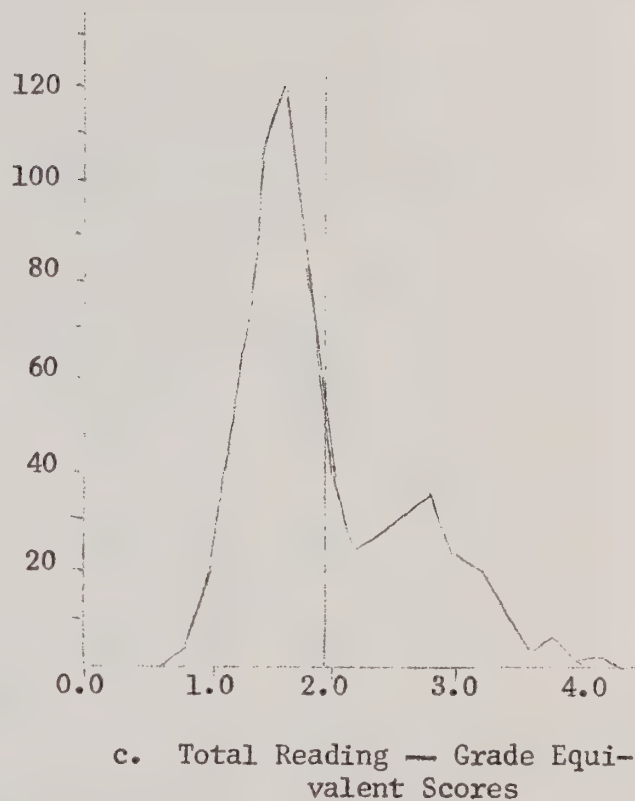
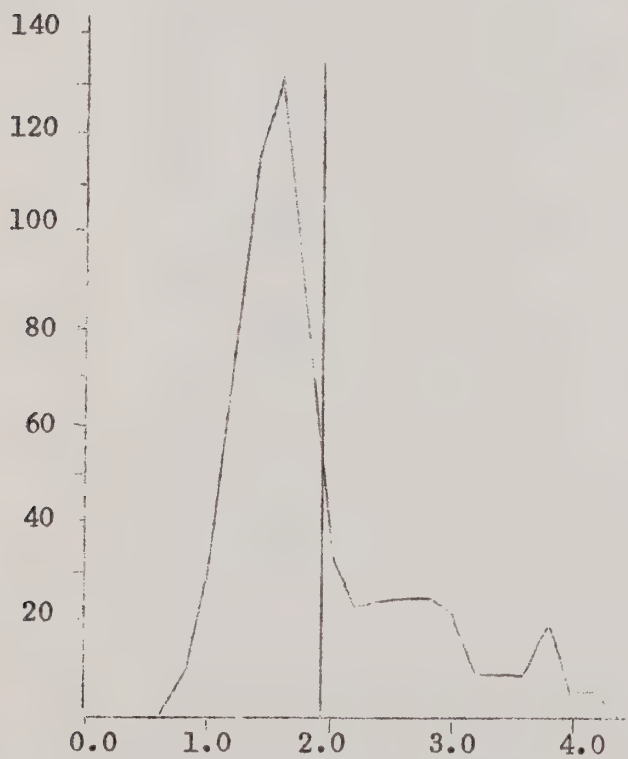
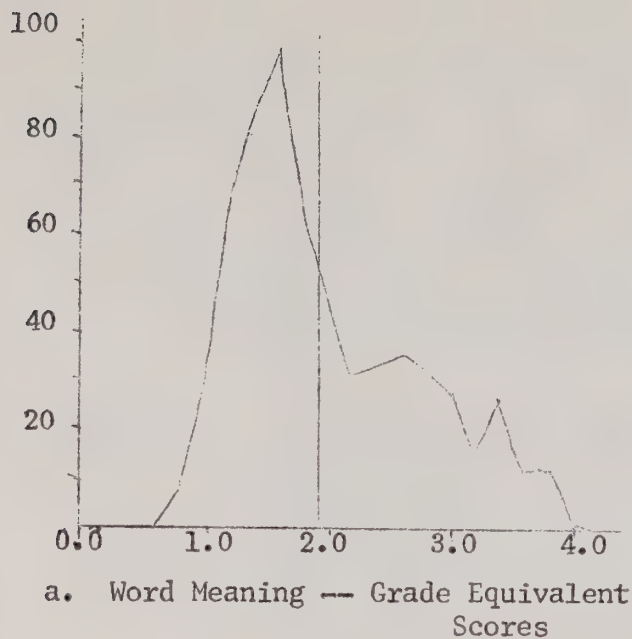


FIGURE 8. BERKELEY UNIFIED SCHOOL DISTRICT — SPRING, 1968
STANFORD ACHIEVEMENT TEST, PRIMARY I, FORM W
FIRST GRADE — NATIONAL MEAN 1.9

Abscissa (X), Grade Equivalents; Ordinate (Y), Frequencies

SECOND GRADE RESULTS

Stanford Achievement Test, Primary II, Form W

Word Meaning -- Vocabulary tested in reading context.

Paragraph Meaning -- Paragraphs increase in complexity and questions progress from recognition of explicit statements to inference of implicit ideas.

TABLE 10. SECOND GRADE TEST RESULTS
NATIONAL MEAN -- 2.9
BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
STANFORD ACHIEVEMENT TEST, PRIMARY II, FORM W
GRADE EQUIVALENT SCORES (1,203 Students)

	Word Meaning	Paragraph Meaning	Total Reading
Mean	2.9	2.8	2.9
Standard Deviation	1.2	1.2	1.1
Upper Quartile	3.6	3.6	3.6
Median	2.8	2.7	2.8
Lower Quartile	2.0	1.9	2.0

Table 10 shows that Berkeley's average second grader is reading almost at grade level, according to national norms for the Stanford Achievement Test. The upper 25% of the students are reading seven months above grade level, while the lower 25% are reading at about nine months below. Forty-six per cent of the students are reading at grade level or above. As with the first grade, the median scores tend to be

somewhat lower than the mean scores, even though, in the second grade, the quartile statistics suggest a fairly even distribution. This would indicate that there are some very high scores pulling up the mean. It is interesting to note that these statistics are very similar to those reported for second graders last year, although this year's scores tend to be slightly lower.

Figure 9 illustrates the positive skewing that seems to be characteristic of SAT test results for Berkeley, and can be interpreted in the same manner as those for the first grade.

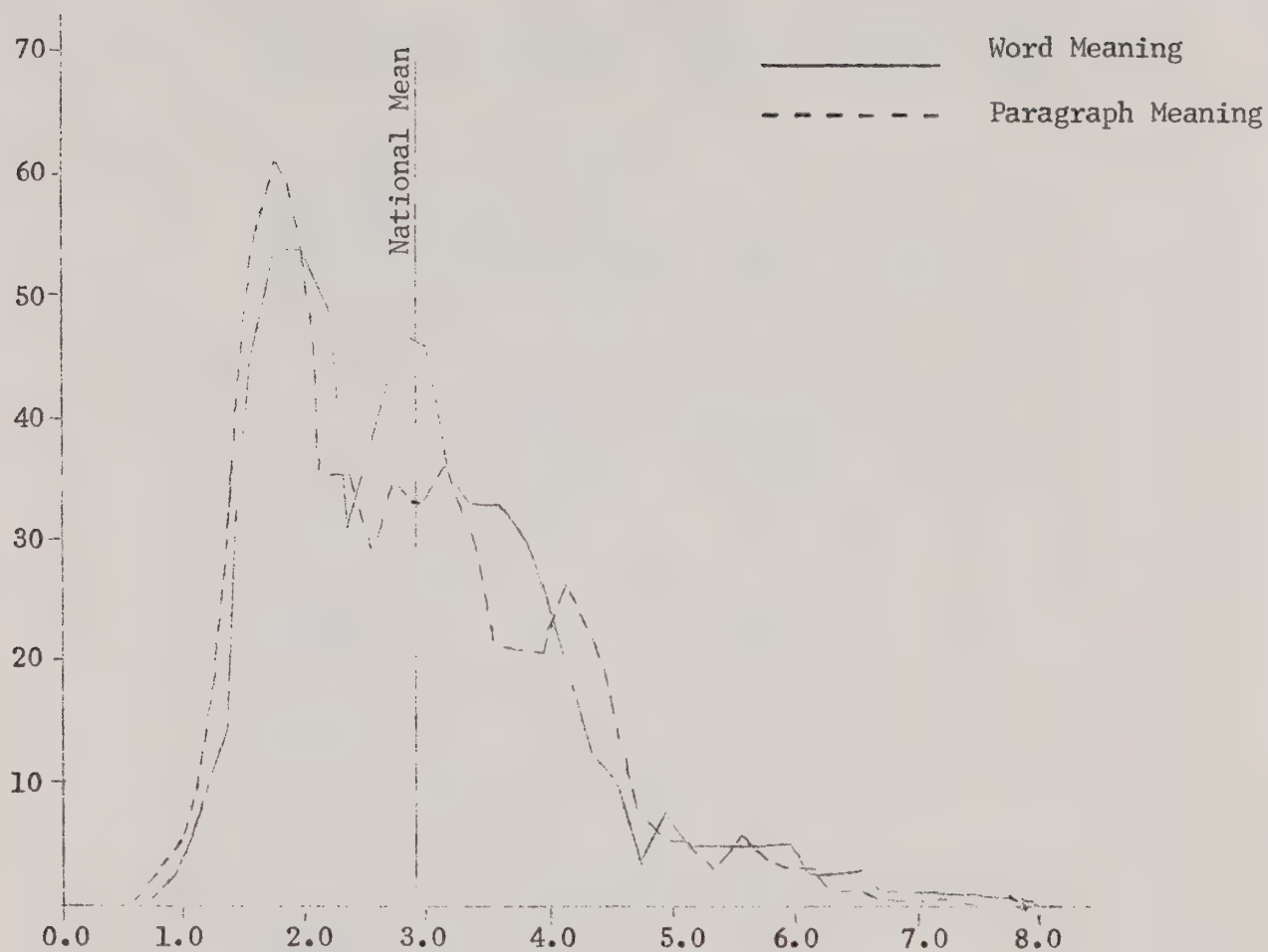


FIGURE 9. BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
 STANFORD ACHIEVEMENT TEST, PRIMARY II, FORM W
 SECOND GRADE -- NATIONAL MEAN 2.9
 WORD MEANING AND PARAGRAPH MEANING

Abscissa (X), Grade Equivalents; Ordinate (Y), Frequencies

THIRD GRADE RESULTS

Stanford Achievement Test, Primary II, Form X

Word Meaning and Paragraph Meaning -- This test is an alternate form of the test given to the second grade. Scores were derived from third grade norms.

TABLE 11. THIRD GRADE TEST RESULTS
NATIONAL MEAN — 3.9
BERKELEY UNIFIED SCHOOL DISTRICT — SPRING, 1968
STANFORD ACHIEVEMENT TEST, PRIMARY II, FORM X

GRADE EQUIVALENT SCORES (1,091 Students)

	Word Meaning	Paragraph Meaning	Total Reading
Mean	3.9	3.7	3.8
Standard Deviation	1.5	1.5	1.4
Upper Quartile	5.1	4.7	4.7
Median	3.8	3.6	3.7
Lower Quartile	2.8	2.7	2.7

Table 11 indicates that Berkeley's third graders are at or slightly below grade level according to the norms for the Stanford Achievement Test, Reading portion. As in the first and second grades, the medians tend to be below the mean figures. The lower quartile scores indicate that about 25% of the third graders are a little more than one full grade below the national norm on each measure, while the top 25% are almost a full grade above the national norm. In

comparison with test results reported for third graders last year, the results this year follow the same general pattern, but tend to be slightly lower than last year's statistics.

Figure 10 illustrates both Word Meaning and Paragraph Meaning frequency distributions, with positive skewing produced by the presence of a number of very high scores, which repeats the pattern already seen in both first and second grades.

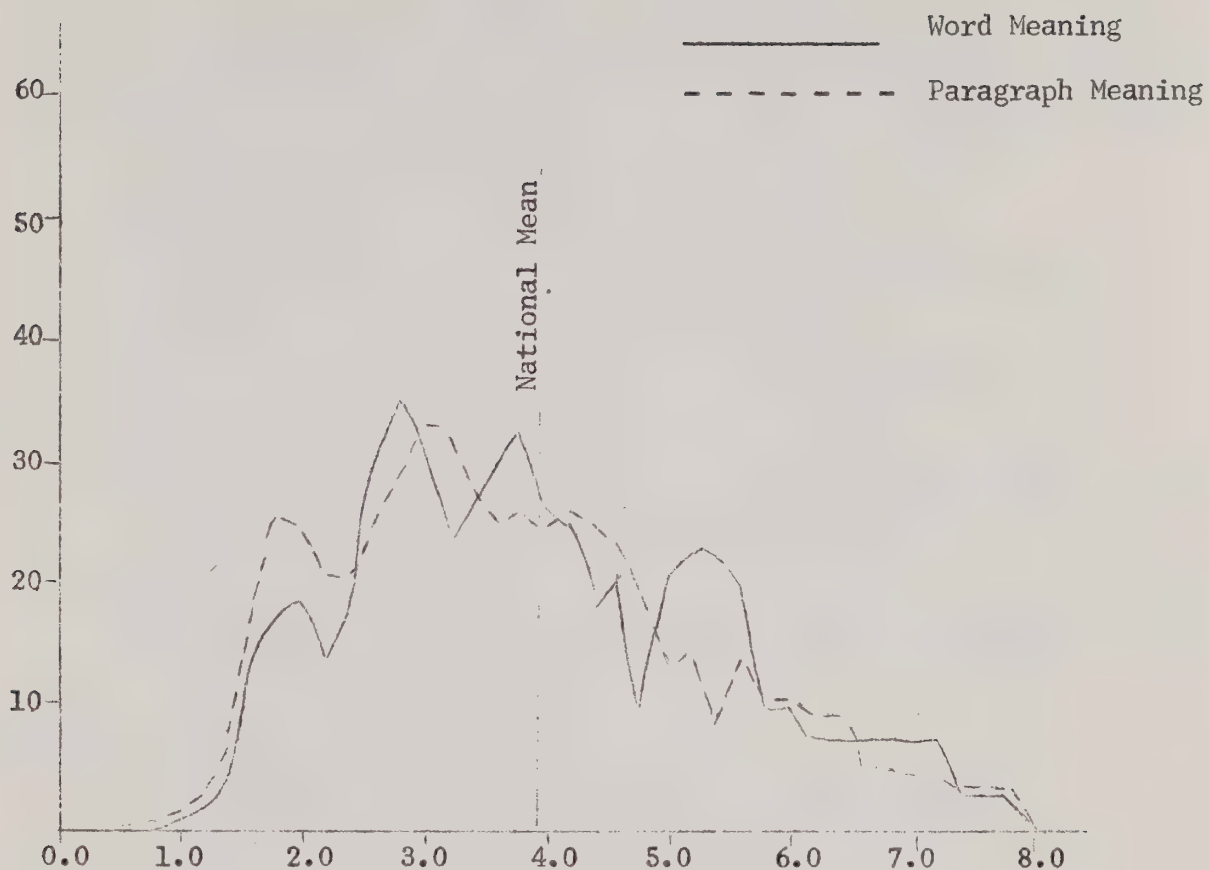


FIGURE 10. BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
 STANFORD ACHIEVEMENT TEST, PRIMARY II, FORM X
 THIRD GRADE -- NATIONAL MEAN 3.9
 WORD MEANING AND PARAGRAPH MEANING

Abscissa (X), Grade Equivalents; Ordinate (Y), Frequencies

FOURTH GRADE RESULTS

Stanford Achievement Test, Intermediate I, Form X — Partial Battery

Word Meaning — Vocabulary items chosen from general reading, school subject matter areas and everyday communication.

Paragraph Meaning — Longer paragraphs include some about which questions are asked, with an increased emphasis on inference.

Spelling — Multiple choice items in which the pupil chooses from four words the one which is spelled incorrectly.

Word Study Skills — Phonics and syllabication.

Language — Exercises in usage, punctuation, capitalization, dictionary skills, and sentence sense.

Arithmetic Computation — Fundamental operations in addition, subtraction, multiplication, and division.

Arithmetic Concepts — Understanding of place value, Roman numerals, operational terms and relationships, number series, number names, estimation, and directed numbers.

Arithmetic Applications — Key concepts applied to reasoning with problems taken from life experiences and to abstract reasoning in mathematical skills.

TABLE 12. FOURTH GRADE TEST RESULTS
 NATIONAL MEAN — 4.9
 BERKELEY UNIFIED SCHOOL DISTRICT — SPRING, 1968
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE I, FORM X

 GRADE EQUIVALENT SCORES (1,078 Students)

	Word Mean.	Para. Mean.	Spell.	Word St. Sk.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Applic.
Mean	5.2	4.9	5.0	4.8	4.6	4.3	4.9	4.8
Standard Deviation	1.8	2.0	1.7	2.1	2.0	1.3	1.8	1.7
Upper Quartile	6.4	6.3	6.2	6.7	6.0	5.2	6.3	5.8
Median	5.1	4.4	4.7	4.6	4.3	4.1	4.8	4.4
Lower Quartile	3.6	3.1	3.6	2.7	2.9	3.5	3.3	3.6

Table 12 indicates that the mean scores for Berkeley's fourth graders in each of the tests listed above fall reasonably close to the national mean, except for Language and Arithmetic Computation. The mean scores for the Language and Arithmetic Computation tests fall three months and six months respectively below the national mean scores. (Note, however, that the average Berkeley student is three months above grade level in Word Meaning.)

The Arithmetic Computation score is consistently low for the entire district. The fourth grade mean score of 4.3 falls at the 28th percentile nationally, and the median score is even lower (4.1). As has been discussed elsewhere,* this is too low to be entirely attributable to the District's use of the new math, and suggests a need for continuing remedial action.

In all cases, the median scores fall below the mean scores of fourth graders. This is a general tendency which has been noted at other grade levels for Berkeley's Stanford Achievement Test results.

Lower quartile scores tend to fall about 1.5 grades below the mean scores. In the Word Study Skills and Language tests, however, the lower quartile scores fall 2.1 and 1.7 grades respectively below the means. The Word Study Skills test, given only at the fourth grade level, generally shows the lowest first quartile score for subtests in the Stanford Achievement Test battery. Table 12 also indicates that while the lower quartile for Word Study Skills is the lowest listed, the upper

* Report to SAC (12-9-68) on Evaluation Conference with Implications for Math Instruction. See Appendix.

quartile score of 6.7 on this test is the highest score listed. The implications of this finding are that the present instructional program in word study skills is doing a very satisfactory job for the better students but needs to be supplemented with additional remediation for the less able students. In grades where the Word Study Skills test is not given, students in the lower quartile continue to have the most difficulty in the Language test, as shown in other sections and in last year's test results.

Figure 11 illustrates the frequency distributions for the Word Meaning test and the Arithmetic Applications test. Both curves show Berkeley's characteristic positive skewing of scores, but with the modes for both falling below the national mean. Note that the frequency distribution for Word Meaning is higher than that for Arithmetic Applications above the national mean, while the opposite is true for scores below the national mean.

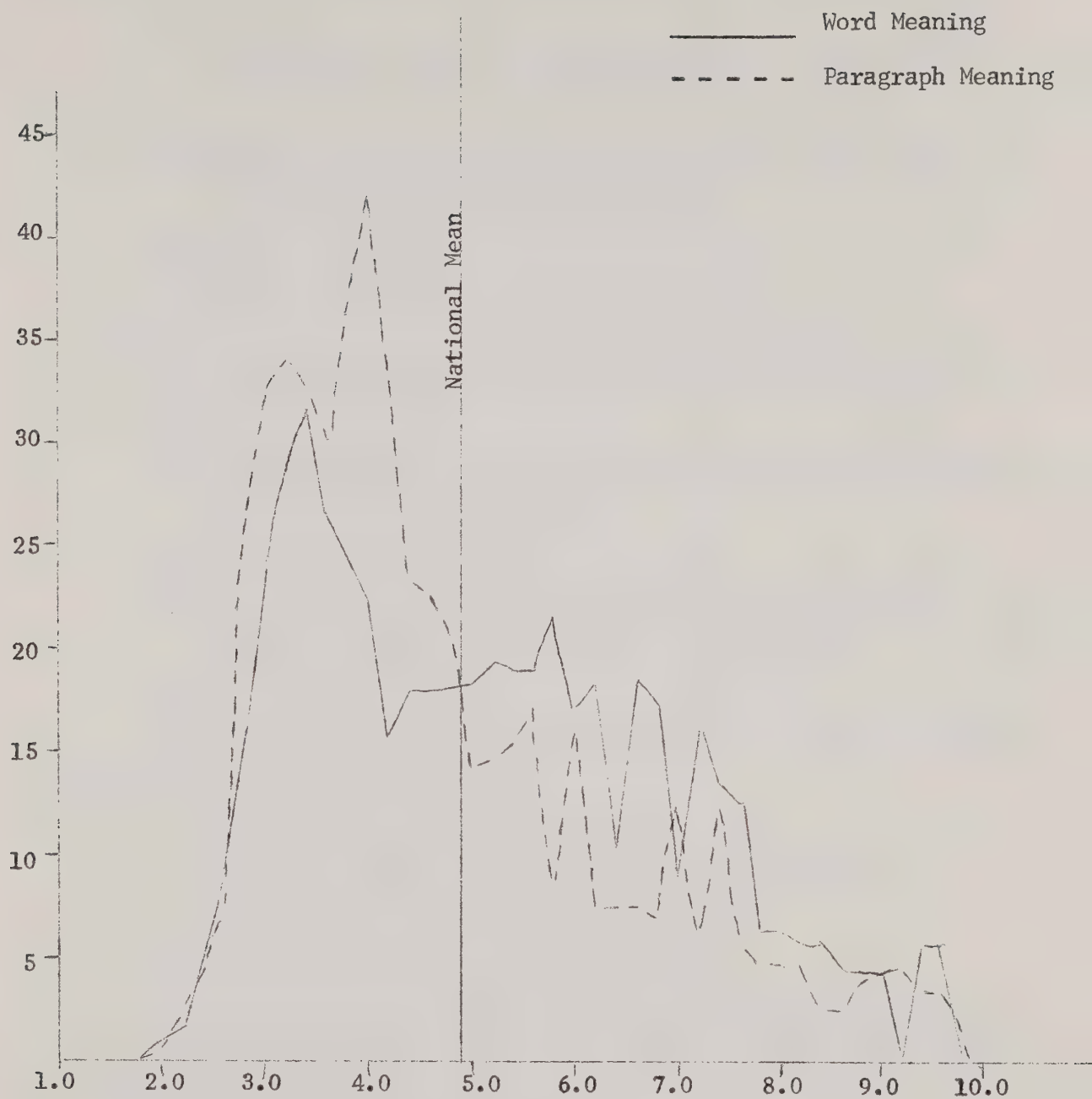


FIGURE 11. BERKELEY UNIFIED SCHOOL DISTRICT — SPRING, 1968
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE I, FORM X
 FOURTH GRADE — NATIONAL MEAN 4.9
 WORD MEANING AND PARAGRAPH MEANING

Abscissa (X), Grade Equivalents; Ordinate (Y), Frequencies

FIFTH GRADE RESULTS

Stanford Achievement Test, Intermediate II, Form X -- Partial Battery

Word Meaning -- Testing in sentence context enables measurement of comprehension of the concepts represented by words, rather than merely synonyms.

Paragraph Meaning -- Balanced reading content represents the science, social studies and humanities areas and calls for interpretation and logical thinking.

Spelling -- The pupil must identify a misspelled word in 56 groups with four words in each group.

Language -- More complex problems of usage and punctuation are used; dictionary skills and sentence structure become more sophisticated.

Arithmetic Computation -- Balanced coverage is given to the skills of computation with whole numbers, common and decimal fractions and denominate numbers.

Arithmetic Concepts -- Concepts tested are extended to include place value in decimal fractions, common denominators, averages, number sentences, meaning of per cent, decimal-fraction equivalents, reduction of fractions, geometric terms and estimation.

Arithmetic Applications -- Realistic problems involve inter-relationships of computation, measurement, and logical thinking.

TABLE 13. FIFTH GRADE TEST RESULTS
NATIONAL MEAN -- 5.9
BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
STANFORD ACHIEVEMENT TEST, INTERMEDIATE II, FORM X
GRADE EQUIVALENT SCORES (1,046 Students)

	Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Applic.
Mean	6.0	5.8	5.7	5.4	4.9	5.7	5.6
Standard Deviation	2.1	2.5	2.1	2.5	1.4	1.7	2.1
Upper Quartile	7.6	7.3	6.8	7.3	5.8	6.6	6.8
Median	5.7	5.3	5.3	5.2	4.8	5.6	5.1
Lower Quartile	4.2	3.9	4.1	3.2	3.8	4.3	4.0

The test statistics for the fifth grade tend to follow the same general pattern as those listed for the fourth grade (Table 12). In general, the means are slightly below the national mean, with Word Meaning being the highest and Language and Arithmetic Computation being the lowest. The Arithmetic Computation mean score of 4.9 is one full year below the national mean and falls at the 26th percentile nationally. This may be only partially attributed to the use of new math. As was seen in the fourth grade results for lower quartile students, the lowest score is the one for the Language subtest. This score falls two years and seven months below the national norm. In general, the fifth graders tended to perform at a lower level, according to national norms, than did the fourth graders.

Figure 12 illustrates the frequency distributions for the Arithmetic Computations and Arithmetic Concepts subtests. Note the large number of students performing in a three-grade range below the national mean. At the same time, note that a number of students on both tests received very high scores.

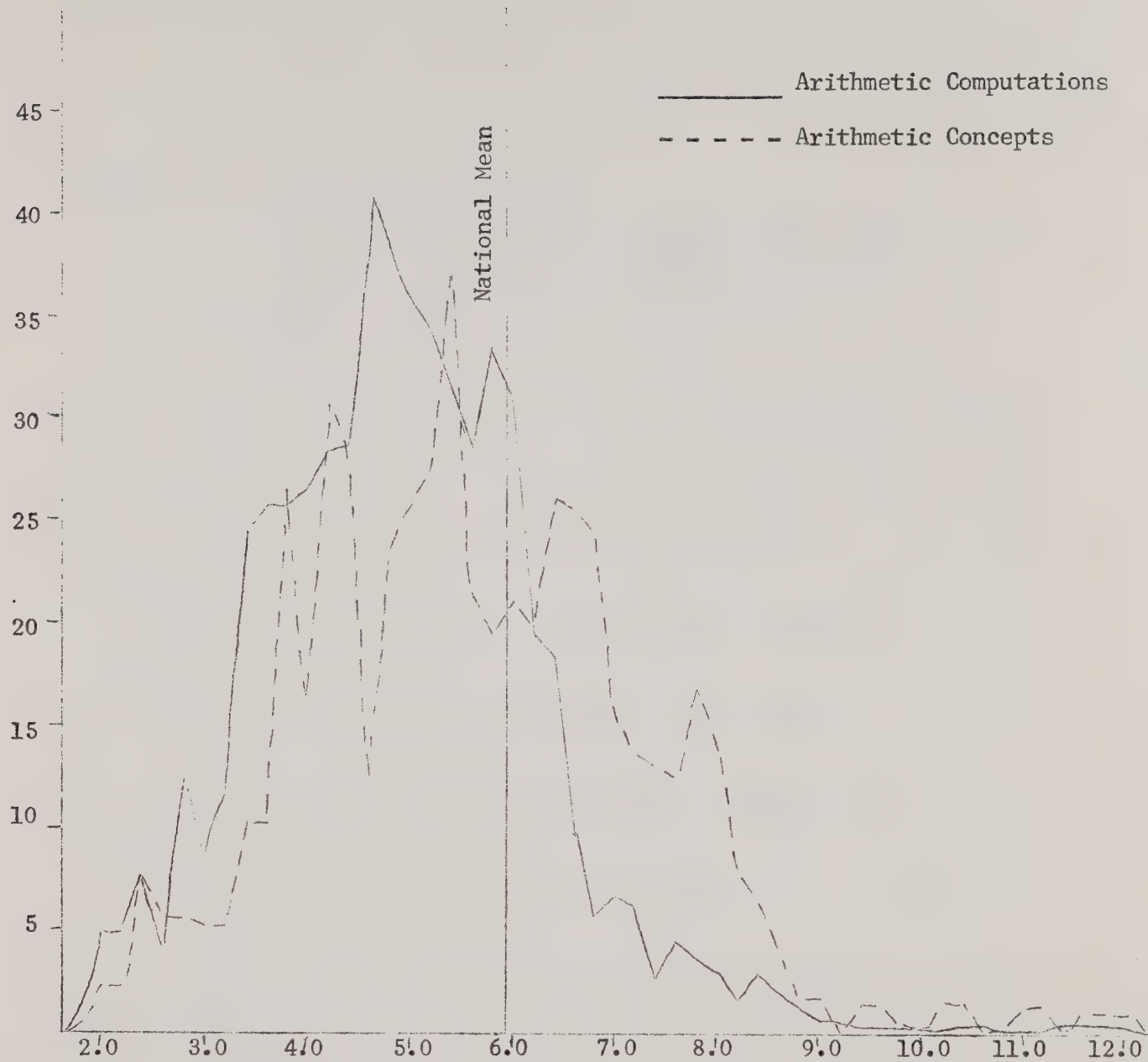


FIGURE 12. BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
 STANFORD ACHIEVEMENT TEST, INTERMEDIATE II, FORM X
 FIFTH GRADE -- NATIONAL MEAN 5.9
 ARITHMETIC COMPUTATIONS AND ARITHMETIC CONCEPTS

Abcissa (X), Grade Equivalents; Ordinate (Y), Frequencies

SIXTH GRADE RESULTS

Stanford Achievement Test, Intermediate II, Form Y -- Partial Battery

This test is an alternate form of the test given to the fifth grade. Scores were derived from sixth grade norms.

TABLE 14. SIXTH GRADE TEST RESULTS
NATIONAL MEAN -- 6.9
BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
STANFORD ACHIEVEMENT TEST, INTERMEDIATE II, FORM Y

GRADE EQUIVALENT SCORES (1,070 Students)

	Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Applic.
Mean	6.9	6.9	6.7	6.1	5.8	6.8	6.5
Standard Deviation	2.4	2.6	2.3	2.6	2.0	2.4	2.6
Upper Quartile	8.7	8.7	8.0	8.0	6.6	8.2	8.3
Median	6.9	6.5	6.6	6.0	5.5	6.5	6.3
Lower Quartile	4.7	4.7	4.8	3.7	4.4	5.2	4.2

As with the fourth and fifth grade results, the sixth grade mean scores for each test tend to be slightly lower than the national mean, on the average about four months below grade level. In this case, the highest score is for Paragraph Meaning, which falls at the national mean. Again, the lowest scores are for Language and Arithmetic Computation, with scores falling below grade level by eight months and one year respectively. Again, the Arithmetic Computation score is

too low to be justified by the use of the new math. The mean score of 5.8 falls at the 23rd percentile nationally. As with the fifth grade, the lowest first quartile score is in the Language subtest. Twenty-five per cent of the students are performing three years and two months below grade level on this subtest. The highest third quartile score is 8.7, which is one year and eight months above grade level, and was obtained for both Word Meaning and Paragraph Meaning. Overall, this year's sixth graders tended to do slightly less well than sixth graders last year.

As a general observation it has been noted that the elementary students tended to make lower scores on the tests administered in May, 1968 than were made by corresponding class groups on the tests given in May, 1967. The probable explanation for this is the difference in testing conditions. For the first time, the District used outside test administrators to secure test results in May, 1968. This approach (rather than using teachers) was taken to meet the requirements of standardized testing conditions set up by the University of California as they collected the baseline data to be used in the evaluation of the Elementary Integration program. Unfortunately, the testing program got a late start and deadline pressures to complete the task before schools closed for the summer in some cases left insufficient time for adequate preparation of students for the unfamiliar testing conditions.

GROUP TEST RESULTS
COMPARISONS OF SCORES

The next three tables deal with the subject of growth in achievement by fourth, fifth, and sixth graders during the 1967-68 school year. These three classes were tested using the Stanford Achievement Tests in October, 1967 and again in May, 1968. The national norm grade placement scores at the time of the two testings for fourth graders, for example, were 4.2 and 4.9 respectively and are read fourth grade, second month, and fourth grade, ninth month. Comparable norms apply to the fifth and sixth grades as well. In the tables, the amount of growth, expressed in grade equivalent scores of years and months of growth, is read by looking at the rows labeled "Difference". These growth readings are taken at four different levels: the mean, upper quartile, median, and lower quartile. The overall, general picture of the growth rate can be seen by looking at the "Difference" scores in the last column of the tables.

Two variables not shown in the tables have had some effect on the results presented here. The first of these is the fact that different testing conditions prevailed during the Fall and Spring tests. The District's traditional group testing procedure, which has the tests administered by classroom teachers was employed in the Fall, while "outside" testers (a team from the University of California) conducted the Spring testing program.

The second variable is produced by the questionable validity of the achievement test results secured from the District's low achievers. A significant number of the scores made by the lower quartile students were below chance level on the state-mandated SAT tests. This latter

fact should be kept in mind when noting grade equivalent scores (and amount of growth made) for lower quartile students.

TABLE 15. FOURTH GRADE STANFORD ACHIEVEMENT TEST RESULTS -- 1967-68
 COMPARISON OF FALL AND SPRING ACHIEVEMENT TEST RESULTS
 PUBLISHERS MEAN SCORES -- FALL 4.2 -- SPRING 4.9

		Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.	$\bar{X}$
Mean Scores	Fall '67	4.5	4.4	4.2	3.9	3.5	4.1	4.3	4.1
	Spring '68	5.2	4.9	5.0	4.6	4.3	4.9	4.8	4.8
Difference		+0.7	+0.5	+0.8	+0.7	+0.8	+0.8	+0.5	+0.7
Upper Quartile Scores	Fall '67	5.6	5.5	4.8	5.0	4.0	5.5	5.2	5.1
	Spring '68	6.4	6.3	6.2	6.0	5.2	6.3	5.8	6.1
Difference		+0.8	+0.8	+1.4	+1.0	+1.2	+0.8	+0.6	+1.0
Median Scores	Fall '67	4.1	4.0	3.8	3.3	3.6	4.0	4.0	3.8
	Spring '68	5.1	4.4	4.7	4.3	4.1	4.8	4.4	4.6
Difference		+1.0	+0.4	+0.9	+1.0	+0.5	+0.8	+0.4	+0.8
Lower Quartile Scores	Fall '67	3.1	2.9	3.1	2.6	2.9	2.5	3.2	2.9
	Spring '68	3.6	3.1	3.6	2.9	3.5	3.3	3.6	3.3
Difference		+0.5	+0.2	+0.5	+0.3	+0.6	+0.8	+0.4	+0.4

Looking at Table 15 it can be seen that the average fourth grader made the expected growth of seven months improvement in achievement when his scores on all seven tests are combined and considered as a single score (see Mean Difference score in last column).

The top 25% of the class made an average growth of one full year (see Upper Quartile Difference, last column), while the lower 25% of the class made a growth of only four months (Lower Quartile Difference).

Earlier sections of the report have dealt with the relative strengths and weaknesses of the students by examining the grade equivalent scores on the individual subtests. They can be examined here in summary form and show that Language is the area of lowest achievement among the bottom 25% of the class (lower quartile), Arithmetic Computation the lowest among the average students (mean score) and top 25% of the class (upper quartile).

Generally, the fourth grade is making satisfactory progress and compares favorably with the national norm (4.9) by achieving an average grade placement score of 4.8 as measured by the Spring, 1968 Stanford Achievement Test.

TABLE 16. FIFTH GRADE STANFORD ACHIEVEMENT TEST RESULTS — 1967-68
COMPARISON OF FALL AND SPRING ACHIEVEMENT TEST RESULTS
PUBLISHERS MEAN SCORES — FALL 5.2 — SPRING 5.9

		Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.	$\bar{X}$
Mean Scores	Fall '67	5.4	5.2	5.0	5.1	4.5	5.3	5.1	5.1
	Spring '68	6.0	5.8	5.7	5.4	4.9	5.7	5.6	5.6
Difference		+0.6	+0.6	+0.7	+0.3	+0.4	+0.4	+0.5	+0.5
Upper Quartile Scores	Fall '67	7.5	6.9	6.0	7.1	5.4	6.8	6.5	6.6
	Spring '68	7.6	7.3	6.8	7.3	5.8	6.6	6.8	6.9
Difference		+0.1	+0.4	+0.8	+0.2	+0.4	-0.2	+0.3	+0.3
Median Scores	Fall '67	5.2	4.8	4.7	4.8	4.4	5.4	4.7	4.9
	Spring '68	5.7	5.3	5.3	5.2	4.8	5.6	5.1	5.3
Difference		+0.5	+0.5	+0.6	+0.4	+0.4	+0.2	+0.4	+0.4
Lower Quartile Scores	Fall '67	3.5	3.1	3.6	2.9	3.5	3.6	3.4	3.4
	Spring '68	4.2	3.9	4.1	3.2	3.8	4.3	4.0	3.9
Difference		+0.7	+0.8	+0.5	+0.3	+0.3	+0.7	+0.4	+0.5

Table 16 presents the same summary information for the fifth grade as the preceeding one did for the fourth grade. The fifth graders didn't do quite as well as the fourth graders since their average growth was only five months between the two testing times, and the average fifth grader was performing three months below (5.6) the national norm (5.9) at the time of the Spring SAT testing.

The top students (upper quartile) made only three months

growth, although this was enough to have them performing one whole year above the national norm. The lower 25% of the class made an average growth of five months. The fifth grade showed the same pattern of performance on the individual tests as was noted for the fourth grade, with Language being the most difficult area for low achievers and Arithmetic Computation the most difficult for the average and high achievers.

TABLE 17. SIXTH GRADE STANFORD ACHIEVEMENT TEST RESULTS -- 1967-68
COMPARISON OF FALL AND SPRING ACHIEVEMENT TEST RESULTS
PUBLISHERS MEAN SCORES -- FALL 6.2 -- SPRING 6.9

		Word Mean.	Para. Mean.	Spell.	Lang.	Arith. Comp.	Arith. Conc.	Arith. Appl.	$\bar{X}$
Mean Scores	Fall '67	6.1	6.3	6.1	6.0	5.2	6.4	6.4	6.1
	Spring '68	6.9	6.9	6.7	6.1	5.8	6.8	6.5	6.5
Difference		+0.8	+0.6	+0.6	+0.1	+0.6	+0.4	+0.1	+0.4
Upper Quartile Scores	Fall '67	7.6	7.8	7.6	7.7	6.0	7.8	8.3	7.5
	Spring '68	8.7	8.7	8.0	8.0	6.6	8.2	8.3	8.1
Difference		+1.1	+0.9	+0.4	+0.3	+0.6	+0.4	0.0	+0.6
Median Scores	Fall '67	5.9	6.1	5.9	5.9	5.0	6.1	6.1	5.9
	Spring '68	6.9	6.5	6.6	6.0	5.5	6.5	6.3	6.3
Difference		+1.0	+0.4	+0.7	+0.1	+0.5	+0.4	+0.2	+0.4
Lower Quartile Scores	Fall '67	4.4	4.3	4.4	3.7	4.1	4.9	4.2	4.3
	Spring '68	4.7	4.7	4.8	3.7	4.4	5.2	4.2	4.5
Difference		+0.3	+0.3	+0.4	0.0	+0.3	+0.3	0.0	+0.2

Table 17 is the last of this series and presents the summary statistics on achievement growth scores for the sixth grade. The average growth made by this class between testing times was four months, which resulted in the sixth grade performing four months below the national norm (6.9) at the time of the Spring testing.

However, the upper 25% of the class made a growth of six months, which resulted in their Spring scores being a year and two

months above the national norm (6.9). Growth was most marked for this group on the Word Meaning subtest where a year and a month growth took place. The low achievers continue to show Language to be their most difficult area and were unable to show any growth in this skill between the two testing times. You are reminded, however, that some doubt can be cast on the validity of the scores at the lower quartile since a number of these low achieving students were found to be scoring below the chance level.

Perhaps more significant than these above findings is what is shown by making some comparisons between Berkeley's students and other California students. In the next nine tables, comparisons are made between Berkeley and the state as a whole.

TABLE 18a. FIRST GRADE READING TEST
 BERKELEY UNIFIED SCHOOL DISTRICT --SPRING, 1968
 STANFORD TOTAL READING RAW SCORES --PRIMARY I, FORM W
 COMPARISON OF BERKELEY AND CALIFORNIA RAW SCORES

	Berkeley	California	Berkeley Difference
Mean	39.7	36.1	+3.6
Upper Quartile	60.9	48.3	+12.6
Median	36.7	32.7	+4.0
Lower Quartile	22.7	22.6	+0.1

TABLE 18b. PUBLISHERS (NATIONAL) GRADE EQUIVALENT SCORES FOR ABOVE
 TABLE PUBLISHERS MEAN — 1.9

	Mean	Upper Quartile	Median	Lower Quartile
Berkeley	1.7	2.5	1.7	1.5
California	1.7	1.9	1.6	1.5
Berkeley Difference	0.0	+0.6	+0.1	0.0

The above tables (18a and 18b) make a comparison between Berkeley first grade and California first grade reading scores. Both raw scores (Table 18a) and grade equivalent scores (Table 18b)

are reported. The conclusion to be drawn from this information is that Berkeley's first graders do better than the first graders of the state as a whole. This is especially noticeable at the upper quartile (Q3) level where Berkeley performs six months above the state level. There is little or no difference between the two groups at the median or lower quartile (Q1) levels. Both Berkeley and California are performing two months below the publishers (national) mean score level of 1.9 with their mean grade equivalent scores of 1.7.

TABLE 19a. SECOND GRADE READING TEST
 BERKELEY UNIFIED SCHOOL DISTRICT -- SPRING, 1968
 STANFORD TOTAL READING RAW SCORES -- PRIMARY II, FORM W
 COMPARISON OF BERKELEY AND CALIFORNIA RAW SCORES

	Berkeley	California	Berkeley Difference
Mean	45.6	41.7	+3.9
Upper Quartile	65.3	57.1	+8.2
Median	45.9	39.7	+6.2
Lower Quartile	24.7	25.1	-0.4

TABLE 19b. PUBLISHERS (NATIONAL) GRADE EQUIVALENT SCORES FOR ABOVE
 TABLE PUBLISHERS MEAN -- 2.9

	Mean	Upper Quartile	Median	Lower Quartile
Berkeley	2.7	3.5	2.7	1.9
California	2.6	3.1	2.5	1.9
Berkeley Difference	+0.1	+0.4	+0.2	0.0

The above two tables (19a and 19b) make a comparison between Berkeley second grade and California second grade reading scores as measured by the Stanford Reading test.

Both raw scores (Table 19a) and grade equivalent scores (Table 19b) are reported. The results are similar in pattern to those

found for the first grade. Berkeley second graders are performing better than the second graders of the state as a whole. The greatest difference is found at the upper quartile (Q3) level where Berkeley performs four months above the state level. At the median level Berkeley continues to exceed the state scores by two months, and there is no difference between the two groups at the lower quartile (Q1) level.

Berkeley is two months below and California three months below the publisher's (national) mean score level of 2.9.

the first and second grades. Berkeley's third graders are performing better than the third graders of the state as a whole. The greatest difference is found at the upper quartile (Q3) level where Berkeley performs five months above the state level. At the median level Berkeley continues to exceed the state scores by two months, and there is no difference between the two groups at the lower quartile (Q1) level.

Berkeley is performing five months below and California seven months below the publisher's (national) mean score level of 3.9.

TABLE 21a. SIXTH GRADE READING TEST
 BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967
 STANFORD READING TEST -- INTERMEDIATE II, FORM W
 COMPARISON OF BERKELEY AND CALIFORNIA RAW SCORES

	Berkeley	California	Berkeley Difference
Mean	60.2	52.2	+8.0
Upper Quartile	85.0	68.0	+17.0
Median	60.0	49.5	+10.5
Lower Quartile	34.0	34.9	-0.9

TABLE 21b. PUBLISHERS (NATIONAL) GRADE EQUIVALENT SCORES AND PERCENTILE
 RANKS FOR THE ABOVE TABLE GRADE EQUIVALENT MEAN = 6.2

	Mean		Upper Quartile		Median		Lower Quartile	
	G.E.	%ile	G.E.	%ile	G.E.	%ile	G.E.	%ile
Berkeley	6.0	46	7.7	82	6.0	46	4.2	12
California	5.5	36	6.6	60	5.4	34	4.3	14
Berkeley Difference	+0.5	+10	+1.1	+22	+0.6	+12	-0.1	-2

The performance of Berkeley's sixth graders on the Stanford Reading test is considerably higher than that of sixth graders throughout the state as a whole. This is especially true when comparing the upper quartile raw scores where a difference of 17 points exists between

Berkeley and state scores (85 vs. 68), as shown in Table 21a above. The average Berkeley sixth grader (with a median raw score of 60) is performing at a level equivalent to the 65th percentile level for California sixth graders. Only at the lower quartile level do the scores become comparable, where the lower quarter of Berkeley's sixth graders make just slightly lower scores than the lower quarter of California's sixth graders in reading (34 vs. 34.9).

Looking at this same data expressed in grade equivalents and percentile ranks (see Table 21b) confirms the findings from the raw score comparisons and adds the dimension of national norms. From this it can be seen that Berkeley's average sixth grader is performing two months below the national norm but California's average sixth grader is seven months low. This disparity increases at the upper quartile level (75th %ile) with California's students only four months above the national mean grade placement level while Berkeley's top 25% students are a year and five months above the national mean. Stated another way, California's top 25% students are only at the 60th percentile nationally while Berkeley's top 25% are at the 82nd percentile nationally.

The conclusion to be drawn from this is that when Berkeley's sixth grade reading scores are compared with those of California's sixth graders, Berkeley's superior scores are due primarily to the high level performance of our average and above average students. It can also be stated, however, that our slower students are "holding their own" when compared with the slower students of the state as a whole.

TABLE 22. TENTH GRADE READING SCORE COMPARISONS BETWEEN BERKELEY AND CALIFORNIA STUDENTS WITH NATIONAL PERCENTILE NORMS
BERKELEY UNIFIED SCHOOL DISTRICT -- FALL, 1967

	Berkeley			California			Berkeley Differences		
	Raw Score	Std. Score	Publ. %ile Rank	Raw Score	Std. Score	Publ. %ile Rank	Raw Score	Std. Score	Publ. %ile Rank
Mean	33.3	47	48	31.8	47	48	+1.5	0	0
Upper Quartile	44.0	55	96	40.6	53	90	+3.4	+2	+6
Median	34.0	48	59	31.4	46	38	+2.6	+2	+21
Lower Quartile	22.0	39	6	22.5	40	8	-0.5	-1	-2

Table 22 makes a comparison between Berkeley tenth graders and their counterparts from the entire state on their reading scores as measured by the Reading test from the Tests of Academic Progress.

Berkeley and California are compared by raw scores, standard scores, and national percentile ranks. Looking at the last three columns of the above table headed "Berkeley Differences", it can be seen that the pattern persists which has been evident throughout this report; i.e., Berkeley scores exceed state scores at the median and upper quartile levels and are slightly lower than the state scores at the lower quartile level. It can be concluded that Berkeley's average and above average students do consistently better than their counterparts for the state as a whole and Berkeley's slower students come

very close to "holding their own" with the slower students of the state as a whole.

APPENDIX

BERKELEY UNIFIED SCHOOL DISTRICT
Office of Evaluation

December 9, 1968

To: SAC

From: Arthur D. Dambacher

Subject: Report on Evaluation Conference, with Implications for Math Instruction

There has been some concern expressed over Berkeley District's continuing failure to improve its poor showing on the Computational Skills section of the Stanford Achievement Math test. For example, in the SAT test just completed this fall by our sixth graders, the following results were obtained, expressed in mean grade equivalent scores:

National Norms	Arithmetic Concepts	Arithmetic Application	Arithmetic Computation
6.2	6.1	6.0	4.8

It is obvious from this table that the Computational Skills level of our sixth graders is lagging behind their performance on Arithmetic Concepts and Application by more than a year. Expressed another way, in terms of percentiles, the picture looks like this:

Berkeley Sixth Grade Performance (%ile)

National Norms	Arithmetic Concepts	Arithmetic Application	Arithmetic Computation
50	50	48	14

From this it can be seen that while our sixth graders are at or near the national norm (50%ile) on Arithmetic Concepts and Application, they are more than 35 percentile points below the national norm in the area of Arithmetic Computation.

It has been our assumption that the District's use of modern math instruction has been the basic source of this discrepancy and that it is

a trend which is rather generally found in other school districts nationally where modern math instruction is given. At a recent conference on Measurement and Evaluation (held in Carmel under the sponsorship of Harcourt, Brace & World, Inc.) a presentation was made which verified this assumption to a certain extent. Mr. Tom Hogan of Harcourt, Brace & World, Inc. has just completed a survey involving a number of school districts from across the nation in which he contrasted the performance of students who have received "traditional" math instruction with those who have been taught "modern" math.

The table below illustrates the general findings of his survey. It should be noted that the groups participating in his survey were generally above average in ability.

Stanford Test Battery (Intermediate II, W)

Type of Math Instruction	Grade	N	Computation		Concepts		Application	
			$\bar{X}$	%ile	$\bar{X}$	%ile	$\bar{X}$	%ile
"Modern"	6.6	4000	6.3	40	7.2	64	7.3	62
"Traditional"	6.6	436	6.7	52	6.6	50	6.6	50

By comparing the percentile scores across the three tests of the "modern" math group (top row), it can be seen that there is a 20 to 25 point gap between Concepts and Application on the one hand and Computation on the other. Making the same type of comparison for the "traditional" group (bottom row) shows practically no difference in the percentile rankings on the three tests.

By comparing grade equivalency scores it can be seen that the "modern" math group was 3 months below grade level (6.3) on the Computation test while showing over 6 months above grade level performance on the Concepts and Application tests. In contrast, the "traditional" math group demonstrated a one month above grade level (6.7) placement on Computational skills while placing right on grade level (6.6) on the Concepts and Application tests.

The conclusion can thus be drawn that students who receive "modern" math instruction will generally show a drop in their Arithmetic Computation skills when compared with students who continue to receive instruction in the "traditional" math program.

One additional comparison is possible if some assumptions are made. Assume that the "modern" math group reported on by Mr. Hogan is representative of all students who are receiving this type of instruction, in the sense that there is a consistent pattern of lower-than-average scores on the Computational Skills test by the "moderns". Assume that the amount of difference between Computation scores on the one hand and

Concepts and Application scores on the other hand is generally representative of the nation's "moderns".

The table below compares the national group with Berkeley.

Comparison of Percentile and Grade Equivalency
Differences between the National Group and
Berkeley School District on Three SAT Tests

	Arithmetic Computation		Arithmetic Concepts		Arithmetic Application	
	%ile	Grade*	%ile	Grade*	%ile	Grade*
National Group	40	5.8	64	6.5	62	6.5
Berkeley District	14	4.8	50	6.1	48	6.0
Differences	26	1.0	14	0.4	14	0.5

* Grade adjusted on National Group to compensate for different testing periods.

From this comparison we can see that the amount of difference between the National Group scores and Berkeley District scores is almost twice as great on the Computational Skills test as it is on either of the other two tests. This observation holds true whether we are contrasting grade equivalent differences or percentile differences between the two groups.

Note for example, that there is a difference of 26 percentile points between the two groups on their Computational Skills scores but only 14%ile points difference between the groups on both the other tests (i.e., compare the last entry in Column 1 with the last entry in Columns 3 and 5). Or, note that there is a full year's difference between the two groups grade-equivalent scores (Column 2) whereas there are only differences of four months and five months (Columns 4 and 6 respectively) on the other two tests.

The conclusion drawn is that Berkeley is similar to the rest of the nation on the SAT Arithmetic tests in that all "modern math" districts show below average Computational Skills scores; but Berkeley differs from the National Group in that our Computational Skills scores are nearly twice as depressed as the scores of the National Group.

Stated another way, we show a definite need for remediation in the Computational Skills area of arithmetic. According to Mr. Hogan, the

rather consistant pattern across the nation is for this depression in Computational Skills to be found in the 4-8 grade range, and to be a problem across ability levels.

Suggested Areas of Remediation

The further findings of Mr. Hogan's study give us some guidelines for action. He found, for example, that speed of computation is not a significant factor in the scoring differences between the "traditionals" and "moderns". Nor do the two groups vary significantly in their Computational Skills in which they are dealing with whole numbers in the basic functions of adding, subtracting, multiplying, and dividing.

The critical areas are found to be fractions, decimals, and percentage, with some lack of skill also demonstrated in dealing with problems of averaging and (at the 8th grade level) ratio equations. He also found that the typical remedial arithmetic program being carried on in districts consisted of whole number computations, which may account for the inability of schools to improve their Computation scores even though they provide remedial instruction in math.

Finally, he pointed out that new national norms will be forthcoming soon (how soon was not stated) and that although these will correct (i.e., improve) the relatively low scores being reported on the Computational test, they will simultaneously correct (i.e., lower) the relatively high scores being made on the Concepts and Application tests.

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